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N° 23,748 A.D. 1892

RECORDED

Date of Application, 23rd Dec., 1892
Complete Specification Left, 23rd Sept., 1893—Accepted, 18th Nov., 1893

PROVISIONAL SPECIFICATION.

Improvements in the Utilization of Flours which are Rich in Diastase.

We, LAWRENCE BRIANT, of 24 Holborn Viaduct, in the City of London, Consulting Chemist, and WILLIAM HENDERSON WALKER, of 4 Albert Road, Birkdale, Southport, in the County of Lancaster, Chartered Accountant, do hereby declare the nature of this invention to be as follows :—

The invention relates principally to the utilization of low grade flours which are now separated from the meal in high class milling.

Since the introduction of high class flours, bread has become less moist and of less flavour. This is due to the fact that in the milling of flours the germ is now entirely or almost entirely separated. This germ is possessed of marked diastasic properties, which therefore were formerly contained in the flour, and as a consequence bread produced from such flour contained a larger proportion of dextrine and other soluble matters and was more digestible than that made from the present high class flours.

Our present invention consists in the separation of the diastase from such low grade flours, which are now practically rejected for bread making, or from any flours rich in diastase, thus permitting of its addition to higher class flours, such as are now commonly used, thereby restoring to bread the sweetness, moistness and flavour of which it has been deprived by the process of milling now adopted and yet preserving its superiority of color. The residue from these low grade flours, which is rich in gluten, is treated and the gluten and starch are each separated. The gluten may be dried by suitable means, ground, and incorporated into biscuits, or added to flours deficient in gluten, or it may be used in its moist condition, or for any of the processes for which gluten is now employed.

The process which we adopt for the treatment of the flour is as follows :—The flour is placed in a suitable vessel, covered with water, which is either cold or lukewarm and must not exceed a temperature of 120° Fahrenheit, and the whole is kept in a state of motion and intermixture by means of stirring machinery until such time as the diastase shall have been properly dissolved. This time will vary with the amount of water used and the temperature of the mixture, but will not be less than one, nor more than six hours. During this stage we prefer to add a small quantity of some preservative, such as sulphurous acid or salicylic acid, in order to prevent the formation of acidity, but care must be taken that the proportion of preservative is not so large as to injure the diastase. When the extraction is complete, the whole is left to deposit and the liquid drawn off and filtered, or the whole may be put through a hydro-extractor or press ; or any suitable means may be used to separate the liquid from the flour. The residue may be washed and the washings added to the bulk of the liquid, and the whole of the liquid, which must be clear or nearly so, is without delay evaporated *in vacuo* to a suitable consistency, and this we prefer to be about 1450 specific gravity.

If desired, in order to assist solidification, the extract may be mixed in the vacuum pan with an ordinary glucose prepared from starch or grain by the acid process or an extract prepared from malts or raw grain by the diastasic process.

The temperature during concentration must not exceed 130° Fahrenheit, but we prefer to work at a temperature not exceeding 120° Fahrenheit, the object being to prevent injury to the diastase by heat.

The evaporated diastase extract is used in bread making in any proportion found

[*Price* 8*d.*]

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desirable, but probably the best proportion is from 6 ounces to 1 pound per sack of flour.

The residue of the flour, after extraction of the diastase, is treated by ordinary methods for the extraction of gluten and starch.

Dated this 23rd day of December 1892.

LAWRENCE BRIANT,
WILLIAM HENDERSON WALKER,
By Harris & Mills,
23, Southampton Buildings, London, W.C., Agents.

COMPLETE SPECIFICATION.

Improvements in the Utilization of Flours which are Rich in Diastase.

We LAWRENCE BRIANT of 24 Holborn Viaduct in the City of London Consulting Chemist and WILLIAM HENDERSON WALKER of 4 Albert Road, Birkdale Southport in the County of Lancaster, Chartered Accountant do hereby declare the nature of our said invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

The invention relates principally to the utilization of low grade wheaten barley and other unmalted flours which are now separated from the meal in high class milling.

Since the introduction of high class flours bread has become less moist and of less flavor. This is due to the fact that in the milling of flours the germ is now entirely or almost entirely separated. This germ is possessed of marked diastasic properties which therefore were formerly contained in the flour and as a consequence bread produced from such flour contained a larger proportion of dextrine and other soluble carbohydrates and nitrogenous matters and was moister yet more digestible than that made from the present high class flours.

Our present invention consists in the separation of the diastase from such low grade unmalted wheaten and other flours which are now practically rejected for bread making or from any unmalted wheaten or other flours rich in diastase, thus permitting of its addition to higher class wheaten or other flours such as are now commonly used either direct to flours or in a liquid or in a concentrated form to the water used in bread making thereby restoring to bread the sweetness, moistness and flavor of which it has been deprived by the process of milling now adopted and yet preserving its superiority of colour.

We are aware that malted grain has already been employed either direct, or a cold or warm extract of it has been made, for the purpose of increasing the moistness and improving the flavor of bread, but the fact that low grade unmalted flours contain diastase has not been recognised, nor has any attempt been made to separate this from the now commonly rejected inferior flours and add it to the high grade flours which so generally contain very little diastase, or none at all.

The residue from these low grade unmalted wheaten and other flours which is rich in gluten is treated and the gluten and starch are each separated. The gluten may be dried by suitable means, ground and incorporated into biscuits or added to flours deficient in gluten ; or it may be used in its moist condition or for any of the processes for which gluten is now, or may be employed.

The process which we adopt for the treatment of the flour is as follows :—

The flour is placed in a suitable vessel, covered with water which is either cold or lukewarm and must not exceed a temperature of 120° Fahrenheit and the whole is kept in a state of motion and intermixture by means of stirring machinery until such time as the diastase shall have been properly dissolved. This time will vary

with the amount of water used and the temperature of the mixture but will not be less than one nor more than six hours. In practice we find one and a half hours to be a suitable time. During this stage we prefer to add a small quantity of some preservative, such as sulphurous acid or salicylic acid, in order to prevent the formation of acidity, and the preservative chosen should be one which may be used in proportion sufficient to prevent decomposition or production of acid or growth of bacteria and yet not injure the diastase.

For this purpose the addition of sodic sulphite in the proportion of $\frac{3}{4}$ oz. to $1\frac{1}{2}$ oz. per 100 gallons of the mass during extraction may be used or its equivalent in sulphurous acid or other sulphite.

If salicylic acid is used its proportion must not exceed $\frac{1}{4}$ oz. per 100 gallons.

When the extraction is complete the whole is left to deposit and the liquid drawn off and filtered, or the whole may be put through a hydro-extractor or press ; or any suitable means may be used to separate the liquid from the flour.

In practice an inert substance may be used to facilitate deposition, as the flour settles only slowly and ordinary brewers isinglass finings may be added in small proportion.

The residue may be washed and the washings added to the bulk of the liquid, and the whole of the liquid, which must be clear or nearly so is without delay evaporated *in vacuo* to a suitable consistency and this we prefer to be about 1450 specific gravity.

If desired, in order to assist solidification the extract may be mixed in the vacuum pan with an ordinary glucose prepared from starch or grain by the acid process, or with an extract prepared from malt or raw-grain by the diastasic process.

The temperature during concentration must not exceed 130° Fahrenheit, but we prefer to work at a temperature not exceeding 120° Fahrenheit, the object being to prevent injury to the diastase by heat.

The evaporated diastase extract is used in bread making in any proportion found desirable but probably the best proportion is from 6 ozs. to 1 lb. per sack of flour.

The residue of the flour after extraction of the diastase is treated by ordinary methods for the extraction of gluten and starch.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is.

1. The utilization of low grade wheaten or other unmalted flours or of wheaten or other unmalted flours which are rich in diastase by the extraction of the diastase therefrom, substantially as herein described.

2. The utilization of low grade wheaten or other unmalted flours or of wheaten or other unmalted flours which are rich in diastase by the extraction of the diastase therefrom and the employment thereof in bread making substantially as herein described.

3. The utilization of low grade wheaten or other unmalted flours or of wheaten or other unmalted flours which are rich in diastase by the extraction therefrom of the diastase they contain by the following process, *viz.* :—(1) Macerating the said flours in water at a temperature not exceeding 120° Fahrenheit and keeping the same stirred for a period of not less than one hour nor more than six hours, (2) the addition during the macerating stage of a small quantity of a preservative such as sulphurous acid or salicylic acid and (3) separating the clear liquid from the solid matter, substantially as herein described.

4. The utilization of low grade wheaten or other unmalted flours or of wheaten or other unmalted flours which are rich in diastase by the extraction therefrom of the diastase they contain by the following process, *viz.* :—(1) Macerating the said flours in water at a temperature not exceeding 120° Fahrenheit and keeping the same stirred for a period of not less than one hour nor more than six hours, (2) the

addition during the macerating stage of a small quantity of a preservative such as sulphurous acid or salicylic acid, (3) separating the clear liquid from the solid matter, and (4) concentrating the extract to the required consistency at a temperature not exceeding 130° Fahrenheit substantially as herein described.

Dated this 23rd day of September 1893.

L. BRIANT,
W. H. WALKER,
By Harris & Mills,
23, Southampton Buildings, London, W.C., Agents.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1893